Name: Answer Key   Date:

Mastery Assessment of Unit 2 (Practice version 101)

Question 1

$a = 45$ $b = 17$

Let f represent a function. If $f[45] = 17$, then there exists a knowable solution to the equation below.

$$y = 2 \cdot (f[3(x+7)] + 5)$$

Find the solution.

$x =$ 8

$y =$ 44

$$3(x+7) = 45$$
$$x + 7 = 15$$
$$\boxed{x = 8}$$

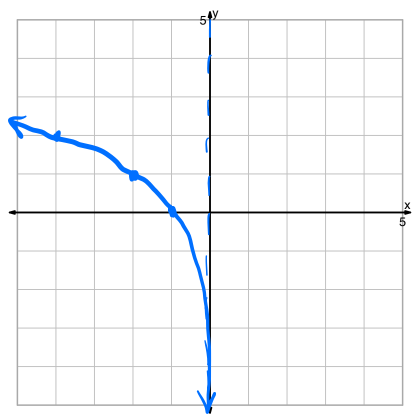
$$y = 2 \cdot (f[a] + 5)$$
$$y = 2 \cdot (b + 5)$$
$$y = 2 \cdot (17 + 5)$$
$$y = 2 \cdot (22)$$
$$\boxed{y = 44}$$

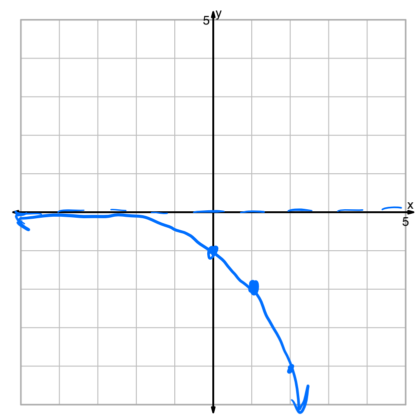
Question 2

Graph the equations accurately. For each integer-integer point on the parent, indicate the corresponding point precisely. Also, with dashed lines, indicate any asymptotes.

horizontal reflection

$y = \log_2(-x)$



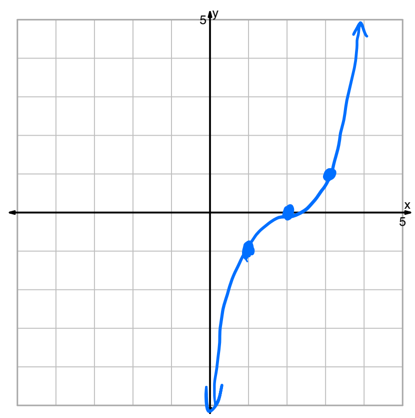


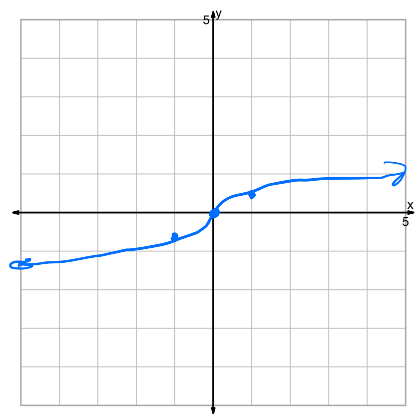
$y = -2^x$

vert refl

shift right

$y = (x-2)^3$





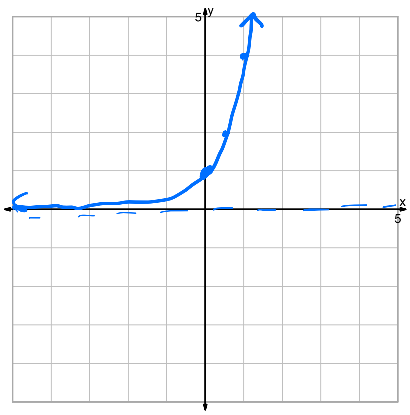
$y = \frac{\sqrt[3]{x}}{2}$

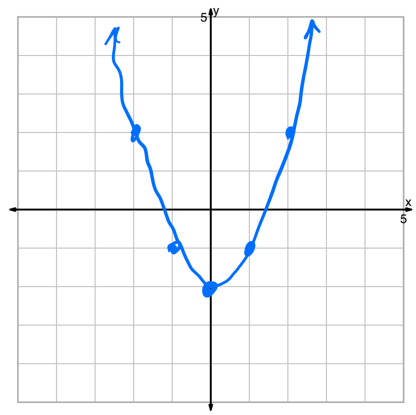
vert shrink

Question 2 continued...

horizontal shrink

$y = 2^{2x}$





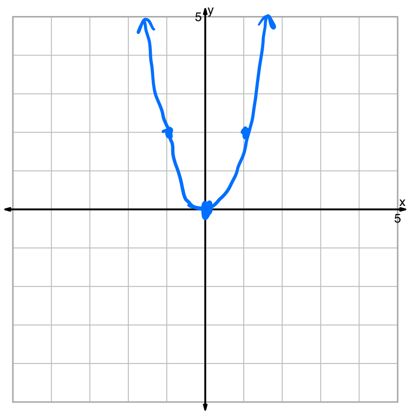
$y = x^2 - 2$

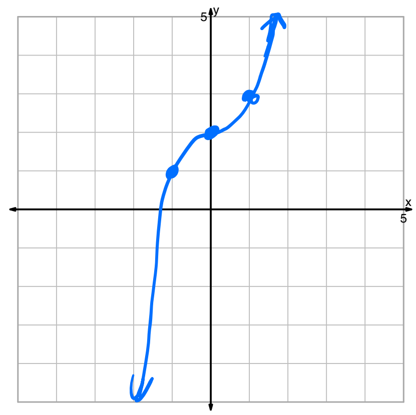
Shift down

translate down

vert stretch

$y = 2 \cdot x^2$



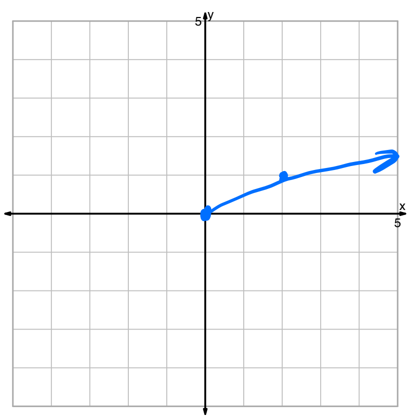


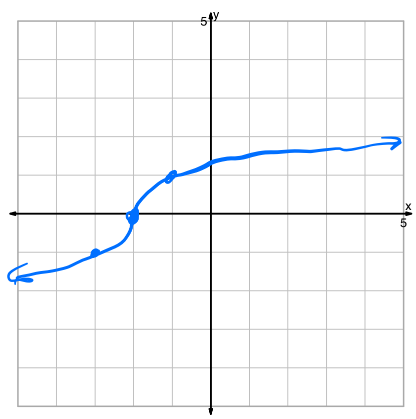
$y = x^3 + 2$

translate up

$y = \sqrt{\frac{x}{2}}$

hor stretch



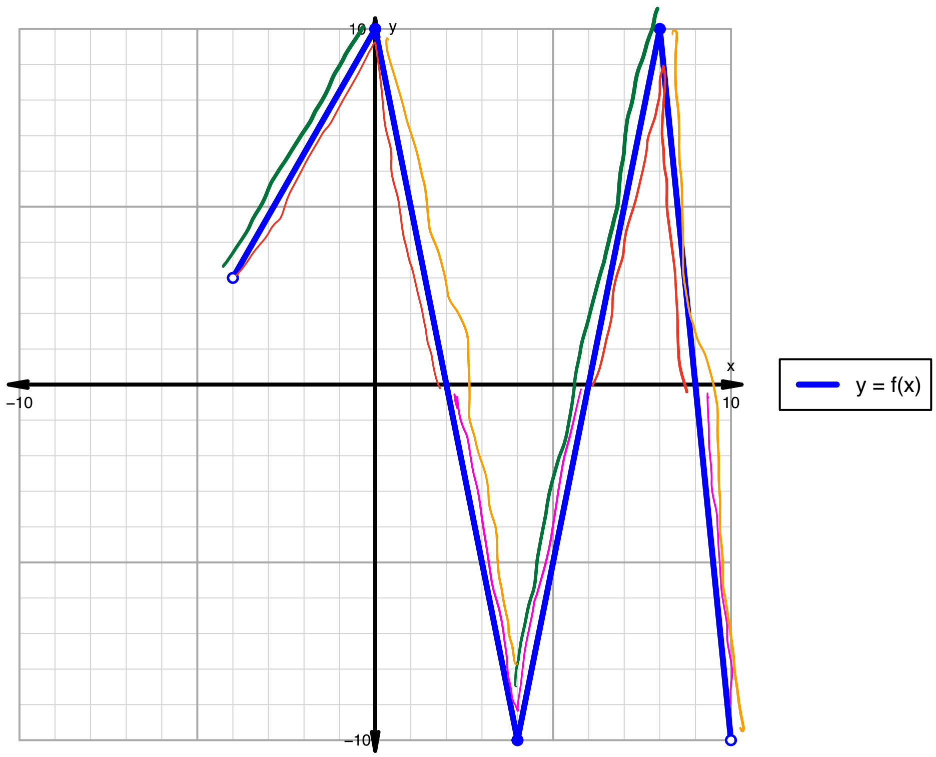


~~Shift~~ translate left

$y = \sqrt[3]{x+2}$

Question 3

A function is graphed below.



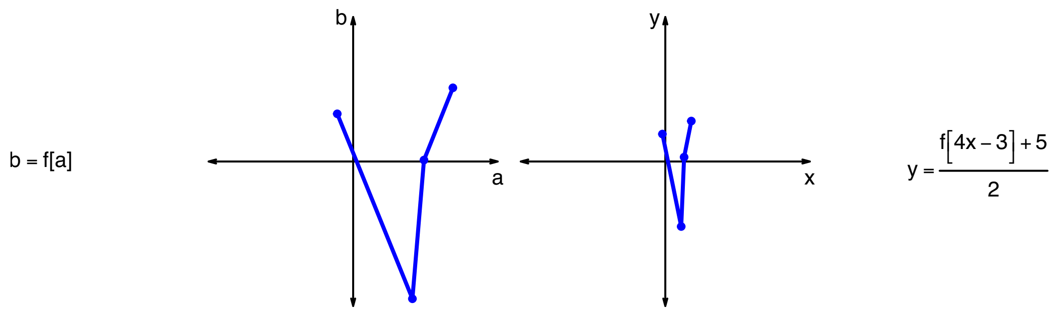
Indicate the following intervals using interval notation.

Feature	Where
Positive	(-4, 2) ∪ (6, 9)
Negative	(2, 6) ∪ (9, 10)
Increasing	(-4, 0) ∪ (4, 8)
Decreasing	(0, 4) ∪ (8, 10)
Domain	(-4, 10)
Range	[-10, 10]

Question 4

Let f represent a function. The curves $b = f[a]$ and $y = \frac{f[4x-3]+5}{2}$ are represented below in a table and on graphs.

a	b	x	y
-11	33	-2	19
41	-95	11	-45
49	1	13	3
69	51	18	28



a. Write formulas for calculating x from a and calculating y from b. (Or, write the coordinate transformation formula.)

$4x - 3 = a$

$4x = a + 3$

$\boxed{x = \frac{a+3}{4}}$

$y = \frac{f[a]+5}{2}$

$\boxed{y = \frac{b+5}{2}}$

b. What geometric transformations (using words like translation, stretch, and shrink), and in what order, would transform the first curve $y = f[x]$ into the second curve $y = \frac{f[4x-3]+5}{2}$?

horizontal

shift right by distance 3

shrink by factor 4

vertical

shift up by dist 5

shrink by factor 2

Question 5 3rd step

A parent square-root function is transformed in the following ways:

Horizontal transformations

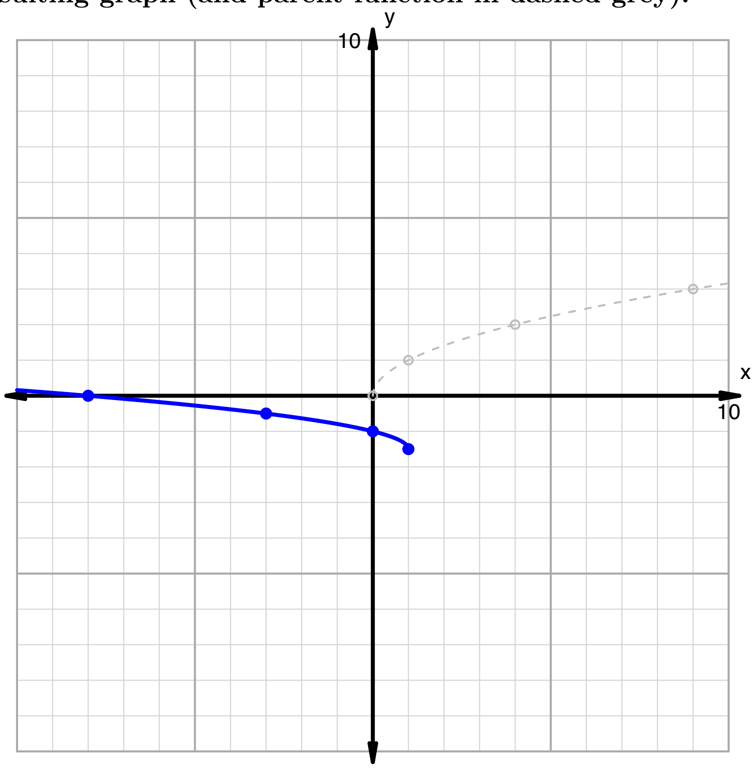
1. Horizontal reflection over y axis. ← 2nd step
2. Translate right by distance 1. ← start here

Vertical transformations

1. Translate down by distance 3. ← 4th step
2. Vertical shrink by factor 2. ↖ Last step

$$y = \frac{\sqrt{-(x-1)} - 3}{2}$$

Resulting graph (and parent function in dashed grey):



- What is the equation for the curve shown above?

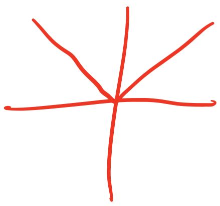
$$y = \frac{\sqrt{-(x-1)} - 3}{2}$$

Question 6

Make an accurate graph, and describe locations of features.

$$y = \frac{-1}{2} \cdot |x - 5| + 1$$

$b = |a|$



a	b
-2	2
-1	1
0	0
1	1
2	2

$a = x - 5$

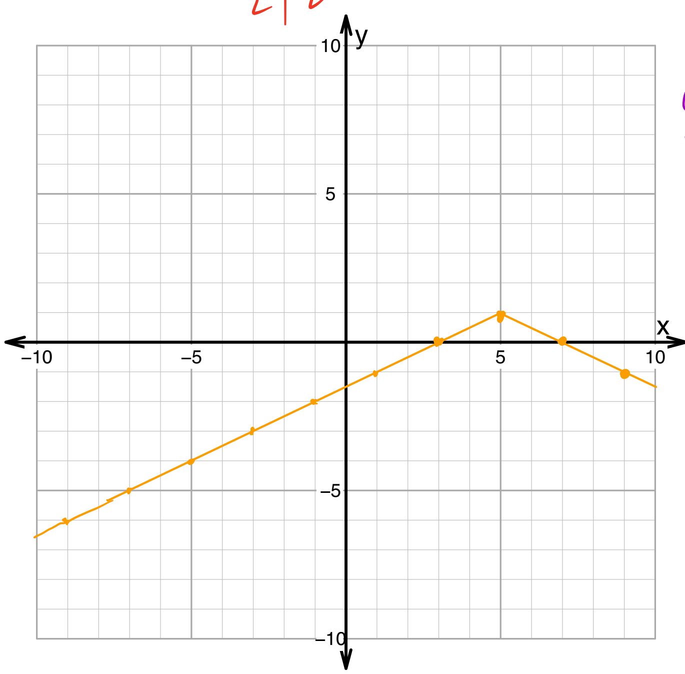
$a + 5 = x$

$\boxed{x = a + 5}$

$y = \frac{-1}{2} \cdot |a| + 1$

$y = \frac{-1}{2} \cdot b + 1$

$\boxed{y = \frac{-b}{2} + 1}$



a	b	x	y
-4	4	1	-1
-2	2	3	0
0	0	5	1
2	2	7	0
4	4	9	-1

I picked easier (a,b) pairs...

Feature	Where
Domain	$(-\infty, \infty)$
Range	$(-\infty, 1]$
Positive	$(3, 7)$
Negative	$(-\infty, 3) \cup (7, \infty)$
Increasing	$(-\infty, 5)$
Decreasing	$(5, \infty)$